Quiz 3 [10 pts] Solutions. September 25, 2008 **Math 111 Sec FC01**

1. Compute the value of each number below. Be sure to show your work:

   (a) $\frac{8!}{6!} = \frac{8\cdot7\cdot6\cdot5\cdot4\cdot3\cdot2\cdot1}{6\cdot5\cdot4\cdot3\cdot2\cdot1} = \frac{8\cdot7\cdot\cancel{6\cdot5\cdot4\cdot3\cdot2\cdot1}}{\cancel{6\cdot5\cdot4\cdot3\cdot2\cdot1}} = \frac{8\cdot7}{1} = 56$

   (b) $P(6,2) = \frac{6!}{(6-2)!} = \frac{6!}{4!} = \frac{6\cdot5\cdot\cancel{4\cdot3\cdot2\cdot1}}{\cancel{4\cdot3\cdot2\cdot1}} = 6\cdot5 = 30$

   (c) $C(6,2) = \frac{6!}{(6-2)!\cdot2!} = \frac{6!}{4!\cdot2!} = \frac{6\cdot5\cdot\cancel{4\cdot3\cdot2\cdot1}}{\cancel{4\cdot3\cdot2\cdot1}\cdot2\cdot1} = \frac{6\cdot5}{2} = \frac{30}{2} = 15$

2. (a) A class of 33 students takes an exam. The teacher is grading on a curve, and will only give an A to four of the students. How many ways can the As be awarded? [You do not need to simplify your answer.]

   There are 4 As to give out, and the order doesn't matter. Therefore this is a combination problem, so the answer is $C(33,4)$.

   (b) Suppose further that the teacher will give out exactly the following grades:

Grade	Number of students
A	4
B	13
C	10
D	4
F	2

   How many ways can the grades be assigned to the class? [You do not need to simplify your answer.]

   Again, this is a combination problem, but this time there are 5 different assignments to make. For the As, there are $C(33,4)$ *ways to select four students to receive an A. Now these students have their grades already, so there are* $33-4=29$ *students left, and thus* $C(29,13)$ *ways to give out the Bs,* etc. *So, the total number of possibilities, using the* generalized multiplication principle, *is:*

$$C(33,4)\cdot C(29,13)\cdot C(16,10)\cdot C(6,4)\cdot C(2,2)$$